

**VIRGINIA DEPARTMENT OF TRANSPORTATION**  
***TRAFFIC ENGINEERING DIVISION***  
**INSTRUCTIONAL & INFORMATIONAL MEMORANDUM**

<b>GENERAL SUBJECT:</b>  Signs Lighting		<b>NUMBER:</b> IIM-TE-380
		<b>SUPERSEDES:</b> None
Overhead Sign Lighting		<b>DATE:</b> July 14, 2015
		<b>SUNSET DATE:</b> None
<b>DIRECTED TO:</b> District Location & Design Engineers Regional Operations Directors Regional Traffic Engineers Regional Operations Maintenance Managers District Bridge Engineers	<b>APPROVAL:</b>   /original signed by/ Raymond J. Khoury, P.E. State Traffic Engineer Richmond, VA Approved July 14, 2015	

**PURPOSE AND NEED**

Studies of overhead sign lighting have demonstrated that the sign lighting does not significantly improve the distance at which an overhead sign is legible as long as the sign has sufficient unencumbered sight distance and has Type IX or higher grade of retroreflective sheeting in satisfactory condition.

Drawbacks to unwarranted overhead sign lighting include:

- Initial installation cost (structural costs, luminaires, control center cabinets, etc.), and
- Ongoing maintenance costs (electric utility costs, periodic luminaire replacement, etc.), and
- Light pollution.

These studies determined that the presence of adjacent roadway lighting placed on the approach to the sign results in a minor increase in legibility distance.

Section 2E.06 of the 2009 Manual on Uniform Traffic Control Devices (MUTCD) states that “*Overhead sign installations should be illuminated unless an engineering study shows that retroreflectorization alone will perform effectively [emphasis added]*”. This Memorandum (including the latest revision to Attachment A of this Memorandum) shall be used by designers when performing that engineering study.

## **EFFECTIVE DATE**

New overhead sign structures: contracts issued for advertisement on or after October 15, 2015 shall be in full compliance. This Memorandum should also be applied to contracts issued for advertisement before that date if feasible.

Existing overhead sign structures with lighting: This Memorandum may be used by Regions to evaluate the potential removal of existing sign lighting.

Existing overhead sign structures without lighting: Existing sign structures without roadway lighting do not need to be evaluated for sign lighting addition unless there are known operational concerns for which sign lighting may be a benefit.

## **CC:**

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# IIM-TE-380 – Attachment A

## Overhead Sign Lighting Standards

### **STANDARDS**

#### **Section 1 – Engineering Study Criteria**

The Engineering Study used to evaluate sign lighting does not require signing and sealing by a Virginia Professional Engineer.

These criteria apply to signs where at least 50% of the surface area is static. Overhead Variable Message Signs, or signs where less than 50% of the surface area is static, do not require sign lighting.

These criteria apply to major overhead guide signs or enlarged regulatory/warning signs (e.g. W19-1 “Freeway Ends 1 Mile” signs) that are attached to cantilever, butterfly, span, or bridge-mount sign structures. They do not apply to signs mounted to mast arms, span wires, or traffic signal span structures.

Overhead sign lighting requirements are detailed in **Table 1** below. “Unencumbered Sight Distance” is defined in Section 2 of this Memorandum.

## IIM-TE-380 – Attachment A Overhead Sign Lighting Standards

**Table 1 – Overhead Sign Lighting Requirements**

Unencumbered Sight Distance **	Overhead Sign Lighting Required? ***
> 950 feet	<ul style="list-style-type: none"> <li><u>Is not required</u> for signs that have Type IX or higher grade of retroreflective sheeting that is in “satisfactory condition” as defined below. May be installed based on engineering judgment.</li> </ul>
800-950 feet	<ul style="list-style-type: none"> <li><u>Should be provided</u> for signs that meet at least one of the following special criteria:               <ol style="list-style-type: none"> <li>1) The sign carries an unusually complex message (such as three or more destinations and multiple route shields on the same sign), or</li> <li>2) The sign is for a System Interchange<sup>1</sup> (junction between two interstates, freeways, or expressways), or</li> <li>3) The sign is for a left exit, or</li> <li>4) The sign is on an arterial or collector, and engineering judgment determines that the sign is situated in visual environment that is complex enough (e.g. multiple business advertising signs competing for driver’s attention) that overhead sign lighting may be beneficial in promoting driver recognition of the sign.</li> </ol> </li> <li><u>Is not required</u> for signs that do not meet any of the above special criteria, as long as the signs have Type IX or higher grade of retroreflective sheeting that is in “satisfactory condition” as defined below. May be installed based on engineering judgment.</li> </ul>
< 800 feet	<ul style="list-style-type: none"> <li><u>Should be provided.</u></li> </ul>

*\*\*Regardless of available unencumbered sight distance, overhead sign lighting should be provided for overhead signs in tunnels or in areas known to routinely experience heavy fog, such as Afton and Fancy Gap Mountains.*

*\*\*\* Special design considerations may be necessary for potential lighting of overhead sign structures located within airport runway approach areas.*

If sign lighting is required for any one sign on a structure, then sign lighting should be supplied for all major signs in the same direction. However, signs for the opposite direction of traffic shall be evaluated separately.

Sign sheeting is considered to be in satisfactory condition if it has appears to meet the minimum retroreflectivity values defined in the latest edition to the MUTCD, and does not have any blemishes (bending, cracking, peeling, bullet holes, etc.) that are significant enough to affect the legibility of the sign.

### Section 2 – Unencumbered Sight Distance Determination

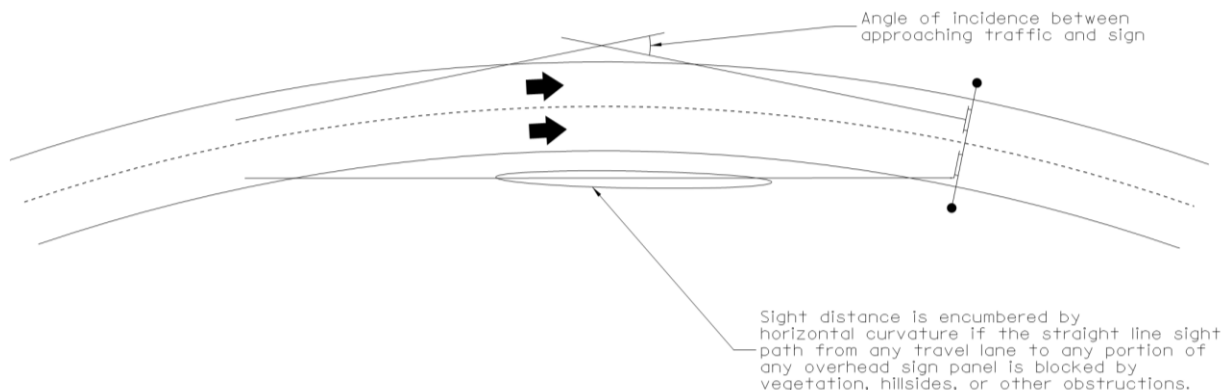
Unencumbered sight distance is defined as continuous sight distance that is unobstructed by horizontal curvature, vertical crest curvature, upstream overpasses, upstream overhead sign structures, or other obstructions. Unencumbered sight distance exists if drivers in all lanes can see all portions of every overhead sign panel on that structure.

<sup>1</sup> Referred to as a Major Interchange, Category A in Section 2E.32 of the 2009 MUTCD

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Horizontal curvature encumbers sight distance if the angle of incidence for the approaching driver is  $\geq$  than 18 degrees<sup>2</sup> off the downstream sign as illustrated below.

Sag vertical curves do not affect the unencumbered sight distance determination.



### Section 3 – Design Requirements for New Overhead Sign Structures

All new sign structures installed without lighting shall still be designed to support the future addition of sign lighting. This includes:

- Providing a minimum vertical underclearance of 19'0" to the bottom of the lowest-mounted sign panel, as required by the Virginia Supplement to the MUTCD, and
- Providing luminaire sign hanger arms at the minimum vertical underclearance of 17'6" as required by the Virginia Supplement to the MUTCD, and
- Designing the structure and foundation to accommodate loading (wind loads and dead loads) from luminaires, and
- Providing spare conduits in the foundation.

All overhead sign structures shall be designed in accordance with the latest applicable VDOT *Road and Bridge Standards* and latest *Road and Bridge Specifications*.

### Section 4 – Sign Lighting Removal on Existing Sign Structures

Sign lighting on existing overhead sign structures may be turned off and ultimately removed at any time, following an engineering study based on the criteria in this Memorandum.

Existing overhead sign structures should be evaluated for potential removal of lighting under any of the following circumstances:

- The existing sign panels with lighting are being replaced or overlaid, or
- A maintenance evaluation reveals that the existing sign lighting is malfunctioning (e.g. most or all luminaires are dark at night), or
- The existing sign structure is being replaced.

When an engineering study determines that existing sign lighting is to be removed, it is recommended that the luminaires be de-energized, but left in place, for a test period of at least

<sup>2</sup> 18 degrees is equivalent to 800 feet of distance on a curve that is approximately 2500 ft in radius.

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three months. During the test period, the Region should verify that the sign sheeting appears to have adequate retroreflectivity and the lack of nighttime illumination has not caused any noticeable operational concerns. If no operational concerns are noted during the test period, then the existing luminaires should be removed. It is recommended that the luminaire sign hanger arms be left in place.

### Section 5 – Existing Sign Structures Without Illumination

Existing sign structures without roadway lighting do not need to be evaluated or retrofitted for new sign lighting unless there are known operational or safety concerns for which sign lighting may be a benefit.

### Section 6 – Sign Lighting Technologies

VDOT's current standard sign lighting technology is High Pressure Sodium (HPS) luminaires. Regions should verify that excessive illumination is not provided with those HPS luminaires, as some research indicates that lower lighting levels offer superior legibility (by producing lesser glare).

Regions may pilot the use of alternative technologies such as Light Emitting Diode (LED) luminaires, subject to the approval of Central Office Traffic Engineering Division. If LED sign lighting luminaires are piloted, the Regions shall evaluate the appropriate illumination levels in cooperation with Central Office Location & Design Division. LED luminaires shall be installed with a luminaire retrieval system similar to what is required for HPS luminaires.

### REFERENCE

- 2009 MUTCD
- 2011 Virginia Supplement to the MUTCD With Revisions
- VDOT Road & Bridge Standards – Standard OSS-1
- [Use of High Intensity Reflective Sheeting in Lieu of External Lighting of Overhead Roadway Signs \(Final Report\)](#). Jackson, Carlson, et. al. University of North Florida, June 2013. Study conducted for the Florida Department of Transportation.
- [Driver Rating of Overhead Guide Sign Legends](#). Chalmers Engineering Services in association with Paul Carlson, 2005. Study conducted for the Arizona Department of Transportation.
- NCHRP 05-20, Guidelines for Nighttime Visibility of Overhead Guide Signs. [Note: the final study is not yet published online as of the date of this Memorandum.]